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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/098,832	06/17/1998	JARI HAMALAINEN	442-008040-U	4557

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EXAMINER
PHAN, MAN U

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2664	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.	Applicant(s)
09/098,832	Hamalainen et al.
Examiner	**Art Unit**
Man Phan	2664

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Jun 17, 1998

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-6 is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-6 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3, 5

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

1. The application of Hamalainen et al. for a "Time division multiple access radio systems" filed 06/17/1998 has been examined. This application claims foreign priority based on the application 972724 dated 06/24/1997 filed in Finland. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. A preliminary amendment to the claims have been entered and made of record. Claims 1-6 are pending.

Claim Objections

2. Claim 5 objected to because of the following informalities:

The claims contain the phrase "capable of". It has been held that the recitation that an element is "capable of" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison, 69 USPQ 138.* Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth

in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-2, 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Persson (US#5,442,635) in view of Ohta (US#5,878,277).

With respect to claims 1-2, 5-6, both of these references teaches the capability of effectively and efficiently carrying out multislot capabilities and utilizing half duplex transmission/reception. Persson (US#5,442,635) discloses a method for dividing a frame structure for a mobile telephone system which operates in *half-duplex*, i.e. in which the *transmission and reception of signals in a mobile takes place within mutually separate time-slots* (TS0 and TM0 respectively). Each frame includes three time-slots, each intended for transmission and reception. According to the method, the frame structure is

divided so that transmission (TX) first takes place in a transmission time-slot (TS0). Reception (RX) then takes places in a reception time-slot (TM0) which is separate from the transmission time-slot (TS0). Subsequent to reception (RX), the frame structure includes an idle time (t.sub.1) which remains until further transmission (TX) takes place in the next-following frame. The method enables the frequency synthesizer (FM) of the mobile in the reception direction to be set to a channel (f.sub.x) different to the reception channel (f.sub.m) and then to be reset accurately to the reception channel (f.sub.m) (Figs. 3, 4 and the Abstract).

However, Persson does not expressly disclose the step of allocating a greater number of times slots in each downlink TDMA frame than in each uplink TDMA frame. In the same field of the endeavor, Ohta (US#5,878,277) teaches in Fig. 2A illustrated a diagram showing the assignment of frequency bands used on a communication path in accordance with the present invention. An entire band 10 utilized for uplink signals transmitted from the terminals 5-1, 5-2 to the head end 1 ranges from *10 to 50 MHZ*, while an entire band 20 utilized for downlink signals reversely transmitted from the head end 1 to the terminal side ranges from *70 to 450 MHZ*. The multimedia communications system according to the present invention utilizes three empty bandwidths (6 MHZ/channel) (indicated by hatched portions in FIG. 2A) 15, 25 in each of the uplink and downlink frequency bands, which have been originally assigned to the transmission of TV signals but are not actually used therefor in the CATV, for bi-directional transmission of audio signals (for telephones and facsimile apparatuses) and data signals (for computers). For more specific illustrations, exemplary assignments of signal bands in each of

bandwidths 15, 25 indicated by hatched portions in Fig. 2A are shown in greater detail in Figs. 2B and 2C, respectively (Col. 8, lines 37 plus). Unlike a common TDD technique in which fixed time slots are allocated to uplink and downlink transmission, an STDD or PSTDD technique allows time slots to be dynamically allocated to either uplink or downlink transmission in accordance with demand, in favor of uplink or downlink.

One skilled in the art would have recognized the need for efficiently providing a method and system for allocating of time slots in uplink/downlink TDMA frames using half duplex, and would have applied Ohta's novel use of the frequency assignment of the frequency bands used on a communication path into Persson's teaching of the division of the frame structure when transmitting and receiving signals in a mobile station. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Ohta' communication system having at least two types of communication channels into Persson's method for dividing a frame structure in a mobile station with the motivation being to provide a system and method for operating a TDMA radio system having multi slot capabilities and utilizing half duplex.

6. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Persson (US#5,442,635) in view of Ohta (US#5,878,277) as applied to the claims above, and further in view of Galyas et al. (US#6,205,157).

With respect to the claims 3-4, these claims differ from claims above in that the claims require wherein the TDMA radio system utilises the GPRS and HSCSD protocols. Currently, the Global System for Mobile Communication (GSM) based PCS systems

operate at 1900 MHZ, and support only up to a rate of 9.6 Kbps for data transfer. Higher rate wideband applications are constantly being sought after to meet the ever growing demand of wireless communication services. Accordingly, High Speed Circuit Switched Data (HSCSD) and General Packet Radio Services (GPRS) are being standardized to accommodate this grave need. In the same field of endeavor, Galyas (US#6,205,157) teaches in Fig. 3 illustrated in more detail, the transport network 45 between the mobile station 15, base transceiver station 30 and interworking function 40 or PCU 46. With the further development of user applications within a public land mobile network (PLMN), a number of high capacity non-speech data services have been introduced. Such services include all circuit-switched data services as defined in TSGSM02.02 and TSGSM02.03, as well as other GSM phase 2+services, including facsimile transmission, high-speed circuit-switched data (HSCSD), high-speed modem connections, and general packet radio services (GPRS). As a result, a telecommunications module known as an interworking function (IWF) 40 has been developed to enable the transmission and protocol adaptation from one telecommunications network, such as a connected PSTN 50, to the serving PLMN. The IWF 40 may be co-located with a particular mobile switching center (MSC) serving a designated geographic area or may be implemented as a separate telecommunications node. The IWF 40 is connected to a transcoder/rate adapter unit (TRAU) 55. The TRAU 55 is further connected to a number of base transceiver stations (BTS) 30 providing radio coverage for mobile stations 15 located within the serving MSC coverage area (Col. 3, lines 31 plus).

One skilled in the art would have recognized the need for efficiently providing a

method and system for allocating of time slots in uplink/downlink TDMA frames using half duplex, and would have applied Galyas's delays generated within a GPRS, HSCSD and Ohta's novel use of the frequency assignment of the frequency bands used on a communication path into Persson's teaching of the division of the frame structure when transmitting and receiving signals in a mobile station. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Galyas' method for propagation delay control, Ohta' communication system having at least two types of communication channels into Persson's method for dividing a frame structure in a mobile station with the motivation being to provide a system and method for operating a TDMA radio system having multi slot capabilities and utilizing half duplex.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Larsson et al. (US#5,956,642) is cited to show the adaptive channel allocation method and apparatus for multi slot, multi carrier communication system. A method and system of adaptive channel allocation in a multi-carrier, multi-slot system is provided. In the method and system a subset of M channels is chosen from a larger set of N channels available for communications on a link. As communications take place on the link, signal quality (C/I) measurements on the channels of the subset of M channels and interference (I) measurements on the channels of the group of N channels are periodically performed.

The C/I and I measurements are then used to reconfigure the subset of M channels to reduce co-channel interference on the link.

The Elliott et al. (US#5,809,015) is cited to show the TDMA communication system for maximizing adjacent pairs of slots in a TDMA frame. A slot selection algorithm for use in a multi-slot TDMA communications system which has provision for transmissions requiring a single time slot or a double time slot. The algorithm requires that whenever possible a transmission requiring a single time slot is allocated to an acceptable, but not necessarily the best, inactive time slot which is located adjacent to an active time slot in a TDMA frame. By so doing the number of inactive time slots available for double time slot transmissions may be increased.

The Gilbert et al. (US#6,016,311) is cited to show an adaptive time division duplexing method and apparatus for dynamic bandwidth allocation within a wireless communication system. An adaptive time division duplexing (ATDD) method and apparatus for duplexing transmissions on a communication link in wireless communication systems. Communication link efficiency is enhanced by dynamically adapting to the uplink and downlink bandwidth requirements of the communication channels. Time slots are flexibly and dynamically allocated for uplink or downlink transmissions depending upon the bandwidth needs of a channel. Communication link bandwidth requirements are continuously monitored using sets of pre-determined bandwidth requirement parameters. Communication channels are configured to have either symmetric or asymmetric uplink/downlink bandwidths depending upon the needs of the channel. Channel bandwidth asymmetry can be configured alternatively in favor of the uplink transmissions (i.e., more

time slots are allocated for uplink transmissions than for downlink transmissions) or in favor of the downlink transmissions (i.e., more time slots are allocated for downlink transmissions than for uplink transmissions).

The Hoshikawa (US#5,124,985) is cited to show a radiocommunication system using time division digital frames. A radiocommunication system comprising a base station and a plurality of terminal stations. The base station includes a transmitting section for arranging a plurality of digital frames on a time-division basis, assigning a channel number to each digital frame, and transmitting the time-division digital frames as a radio signal of a first frequency. Each terminal station includes a receiving section for receiving the radio signal transmitted from the transmitting section of the base station, and separating the time-division digital frames for each channel in accordance with the channel number.

The Takefman (US#5,761,197) is cited to show the communications in a distribution network. A central station of a cable television distribution network transmits TDM frames comprising distribution information and overhead information downstream to customer terminals, and determines corresponding upstream TDMA frames by including an upstream frame identity in the overhead information of each downstream frame. Each terminal buffers asynchronous information for upstream transmission, and stores an upstream frame identity which it is assigned. On detecting this frame identity in the downstream overhead information, the terminal transmit a buffer queue size in an assigned time slot of the corresponding upstream frame. The central station uses the queue sizes from the terminals to allocate time slots in the upstream frames to terminals, by

including their terminal addresses in the downstream overhead information, for transmission of the buffered asynchronous information. The central station can also assign time slots to the terminals for transmission of isochronous information.

The Papadopoulos et al. (US#5,768,254) is cited to show the multiple access cellular communication with signal cancellation to reduce co-channel interference. A method and system for reducing co-channel interference (CCI) in multiple access communication by providing complete or partial cancellation of a mixed CCI interfering signal in a system base station. An exemplary system includes first and second base stations communicating with users in first and second cells, respectively. The first base station transmits a downlink signal to a user in the first cell. The downlink signal is also a mixed CCI interfering signal in that it interferes with reception of an uplink signal in the second base station. A cancellation signal representative of the interfering signal is supplied along a transmission path from the first base station to the second base station. The second base station utilizes the cancellation signal to reduce the effect of the interfering signal on a received composite signal by, for example, combining the cancellation signal or a suitably processed version thereof with the received composite signal. Other aspects of the invention involve reducing mixed CCI by providing non-uniform quality of service, by dropping potentially interfering packets, or by full or partial circular interleaving of packet slot assignments.

The Seshadri et al. (US#5,420,851) is cited to show the method of multiple access. A low delay multiple access scheme called Shared Time-Division Duplexing (STDD), allows both uplink and downlink voice traffic to share a common channel. The scheme

contains separate uplink and downlink control channels and a common voice information channel. The control channels comprise means for signalling voice requirements and acknowledgements of the time slot allocation. Using speech activity detection only, talk spurt speech packets are generated for transmission. STDD dynamically allocates time slots in the common information channel taking advantage of coordinated two-way conversations to achieve high statistical multiplexing gain and more efficient realization of the common information channel.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (703)305-1029. The examiner can normally be reached on Mon - Fri from 6:30 to 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin, can be reached on (703) 305-4366. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3988.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800/4700.

Mphan

12/17/01.

WELLINGTON CHIN
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